



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

26646 7590 12/16/2010

KENYON & KENYON LLP
ONE BROADWAY
NEW YORK, NY 10004

EXAMINER

KAUR, GURPREET

ART UNIT

PAPER NUMBER

1759

DATE MAILED: 12/16/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/578,339

05/05/2006

Rainer Strohmaier

10191/4596

6590

TITLE OF INVENTION: DEVICE FOR MEASURING THE PRESSURE IN A GAS MIXTURE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	03/16/2011

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to: Mail Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

26646 7590 12/16/2010

**KENYON & KENYON LLP
ONE BROADWAY
NEW YORK, NY 10004**

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/578,339	05/05/2006	Rainer Strohmaier	10191/4596	6590

TITLE OF INVENTION: DEVICE FOR MEASURING THE PRESSURE IN A GAS MIXTURE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	03/16/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
KAUR, GURPREET	1759	204-424000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s); (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/578,339	05/05/2006	Rainer Strohmaier	10191/4596	6590
26646	7590	12/16/2010	EXAMINER	
KENYON & KENYON LLP ONE BROADWAY NEW YORK, NY 10004			KAUR, GURPREET	
			ART UNIT	PAPER NUMBER
			1759	
DATE MAILED: 12/16/2010				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 1020 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 1020 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability

Application No.

10/578,339

Examiner

GURPREET KAUR

Applicant(s)

STROHMAIER ET AL.

Art Unit

1759

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed on 9/24/2010.
2. ☒ The allowed claim(s) is/are 21,23-34 and 36-42.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

DETAIL ACTION

Status of the Claims

1. Claims 21, 23-34 and 36-42 are allowed.
Claims 22 and 35 are cancelled.

Drawings

2. The drawings were received on 12/08/2010. The drawings are of Figures 6-8 are acceptable.

EXAMINER'S AMENDMENT

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Barry Greenbaum on 12/06/2010.

4. The application has been amended as follows:

Claim 21. A device for measuring pressure in a gas mixture, comprising:
an amperometric sensor that operates according to a limiting current principle,
thesensor including two first electrodes mounted on a solid electrolyte, a direct voltage

Art Unit: 1759

being applied to the first electrodes, wherein one of the first electrodes is shielded by a diffusion barrier;

a measuring element configured to measure the limiting current flowing via the first electrodes as a measure of the gas pressure; and

an arrangement configured to fix, at least during a pressure measuring phase, a mole fraction of a gas component drawn upon for the pressure measurement upstream of the diffusion barrier to a constant 100%;

wherein the arrangement includes a storage volume for the gas component, the storage volume be arranged in front of the diffusion barrier in the solid electrolyte, a diffusion path closing off the storage volume in a direction of the gas mixture, the arrangement further including two second electrodes situated at the solid electrolyte to pump the gas component all the way through the solid electrolyte into the storage volume,

wherein the sensor includes a Nernst cell made up of a solid electrolyte and two second electrodes situated thereon, a first one of the second electrodes being a measuring electrode and being situated in a measuring chamber developed in the solid electrolyte, and a second one of the second electrodes being a reference electrode and being exposed to a pumped oxygen reference in a reference gas channel developed in the solid electrolyte; and

a pump cell made up of a solid electrolyte and two pump electrodes situated thereon, an outer one of the pump electrodes situated thereon, an outer one of the

Art Unit: 1759

pump electrodes being exposed to the exhaust gas and an inner one of the pump electrodes being situated in the measuring chamber;

wherein the reference gas channel is provided with an opening that is exposed to the exhaust gas, and wherein in the reference gas channel between the reference electrode and the opening, the diffusion path and the storage volume are developed, and an outer one of the pump electrodes and the reference electrode being used as intervals for pumping oxygen and for measuring gas pressure by switching over their voltage potentials.

Claim 33. The device as recited in claim 32, wherein the device is configured as a sensing element to determine oxygen concentration in exhaust gas of an internal combustion engine, electrodes of the sensing element are used as at least on of the two first electrodes of the amperometric sensor and to pump the gas component.

Claim 34. The device as recited in claim 22 33, ~~further comprising:-~~ wherein the sensing element has

a Nernst cell made up of a solid electrolyte and two second electrodes situated thereon, a first one of the second electrodes being situated in a measuring chamber in the solid electrolyte, and a second one of the second electrodes being exposed to a pumped oxygen reference in a reference gas channel developed in the solid electrolyte; and

Art Unit: 1759

a pump cell made up of a solid electrolyte and two pump electrodes situated thereon, an outer one of the pump electrodes being exposed to the exhaust gas and an inner one of the pump electrodes being situated in the measuring chamber;

wherein, in a connecting channel to the exhaust gas which opens out into the measuring chamber, the diffusion path is developed together with the storage volume, the diffusion barrier is situated between the measuring chamber and the storage volume, and the pump electrodes are used intermittently for pumping oxygen and for measuring the gas pressure.

Claim 36. The device as recited in claim ~~30~~ 33, wherein the ~~sensor~~ sensing element has a Nernst cell made up of a solid electrolyte and two second electrodes situated thereon, a first one of the second electrodes being a measuring electrode and being situated in a measuring chamber developed in the solid electrolyte and a second one of the second electrodes being a reference electrode and being exposed to a pumped oxygen reference in a reference gas channel developed in the solid electrolyte, and a pump cell made up of a solid electrolyte and two pump electrodes situated thereon, and outer one of the pump electrodes being exposed to the exhaust gas and an inner one of the pump electrodes being situated in the measuring chamber;

wherein the reference gas channel is provided with an opening that is exposed to the exhaust gas, and wherein, in the reference gas channel between the reference electrode and the opening, the diffusion path and the storage volume, arranged upstream thereof, are developed, and wherein the diffusion barrier is situated in the

Art Unit: 1759

reference gas channel on a side of the reference electrode facing away from the diffusion path, and on the side of the diffusion barrier facing away from the reference electrode the second one of the first electrodes, operated as an anode, is situated, and ~~for pumping oxygen~~, the outer one of the pump electrodes and the reference electrode are drawn upon to pump oxygen, and ~~for measuring the gas pressure~~ the outer ~~pump~~ one of the pump electrodes and the second one of the first electrodes of the amperometric sensor are drawn upon to measure the gas pressure.

Claim 37. A sensing element for determining oxygen concentration in exhaust gas of an internal combustion engine, comprising:

a Nernst cell made up of a solid electrolyte and two electrodes situated thereon, a first one of the electrodes being a measuring electrode and being situated in a measuring chamber developed in the solid electrolyte, and a second one of the electrodes being a reference electrode and being exposed to a pumped oxygen reference in a reference gas channel developed in the solid electrolyte;

a pump cell made up of the solid electrolyte and two pump electrodes situated thereon, an outer one of the two pump electrodes being exposed to the exhaust gas and an inner one of the pump electrodes being situated in the measuring chamber; and

an integrated device for measuring pressure in the exhaust gas, the device configured as the sensing element, electrodes of the sensing element used as at least

Art Unit: 1759

on of the two first electrodes of the amperometric sensor and to pump the gas component, the device including:

an amperometric sensor that operates according to a limiting current principle, the sensor including two first electrodes mounted on a solid electrolyte, a direct voltage being applied to the electrodes, wherein one of the first electrodes is shielded by a diffusion barrier;

a measuring element configured to measure the limiting current flowing via the first electrodes as a measure of the gas pressure; and

an arrangement configured to fix, at least during a pressure measuring phase, a mole fraction of a gas component drawn upon for the pressure measurement upstream of the diffusion barrier to a constant 100%.

Claim 40. The sensing element as recited in claim 31, wherein:

a diffusion path and an oxygen storage volume ~~are~~ arranged in front of the diffusion path in the direction towards the measuring chamber, ~~and~~ are developed in a connecting channel to the exhaust gas, that opens out into the measuring chamber;

the oxygen storage volume being separated from the measuring chamber by the diffusion barrier; and

the pump cell is operated at intervals in such a way that a constant mole fraction of oxygen of 100% is present in the oxygen storage volume, and after switching over a direction of the current in the pump cell, the limiting current flowing via the pump electrodes is recorded as a measure for the pressure of the exhaust gas.

5. The following is an examiner's statement of reasons for allowance: the cited prior art does not teach nor render obvious all the cumulative limitations of claims 21 and 35 with particular attention to a storage volume arranged next to diffusion barrier in solid electrolyte and diffusion path closing of the storage volume in the direction of gas mixture. Furthermore, the cited prior art does not reference gas channel exposed to the exhaust gas and one of the pump electrodes and the reference electrode being used at intervals for pumping oxygen and for measuring gas pressure. The closest structure to the structure of the claimed present invention is a pH altering device taught by Stahl et al. (U.S. Pat. No. 6,495,027) in view of Joshi et al. (U.S. Pat. No. 5,021,137). Stahl et al. teaches an electrochemical sensor comprised of Nernst cell made up of two electrodes, a pump cell made up of two pumping electrodes and a connecting channel with diffusion path (see col. 3, ll. 41-45 and figure 2) and Joshi teaches a solid electrolyte electrochemical cell wherein the electrodes across the electrolyte transport >99% pure oxygen (see col. 3, ll. 24-36).

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

Art Unit: 1759

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GURPREET KAUR whose telephone number is (571)270-7895. The examiner can normally be reached on Monday-Friday 9:00-5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ula C. Ruddock can be reached on (571)272-1481. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. K./

Examiner, Art Unit 1759

/Ula C Ruddock/

Supervisory Patent Examiner, Art Unit 1795